The biology and non-chemical control of Common Mouse-ear (*Cerastium fontanum* Baumg.)

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Common mouse-ear

(common mouse-ear chickweed, mouse-ear chickweed)
***Cerastium fontanum* Baumg.**
(*C. vulgatum, C. holosteoides*)

Occurrence

Common mouse-ear is a short-lived, native perennial, rarely annual plant found in grassland including lawns, and in open, waste and cultivated ground (Stace, 1997). It is sometimes a troublesome weed of arable land including cereals but is commoner on grassland (Salisbury, 1961; Long, 1938). It prefers dry sandy, nutrient rich soils and likes lime (Hanf, 1970). In an early survey of Bedfordshire and Norfolk it occurred on all types of soil but was rarely seen on clay (Brenchley, 1913). It was never prevalent (Brenchley, 1911). It is recorded up to 3,600 ft in Britain and has been found in prehistoric deposits. (Salisbury, 1961).

In set-aside land in Scotland it was one of the most frequent species on unsown fields but represented only 1.6% of the total ground cover (Fisher *et al.,* 1992). In a survey of weeds in conventional cereals in central southern England in 1982, common mouse-ear was found in 0.6% of winter wheat fields but not at all in spring or winter barley (Chancellor & Froud-Williams, 1984). It was frequent in cereals, especially wheat but was thought to be discouraged by root crops (Brenchley, 1920). In a study of seedbanks in some arable soils in the English midlands sampled in 1972-1973, common mouse-ear seed was recorded in 50% of the fields sampled in Oxfordshire and 6% of those in Warwickshire but never in large numbers (Roberts & Chancellor, 1986). It was a common weed in a seedbank survey in swede turnip fields in Scotland in 1982 (Lawson *et al.,* 1982). It was found in 56% of fields sampled. In a survey of seeds in pasture soils in the Netherlands in 1966, common mouse-ear was frequent in the sward and in the soil seedbank (Van Altena & Minderhoud, 1972).

Common mouse-ear consists of a variable complex of subspecies (Clapham *et al.*, 1987).

Common mouse-ear can become infected with cucumber mosaic virus which is transmitted by the aphid *Myzus persicae* (Tomlinson & Carter, 1970). Studies have shown that the virus can also be carried in the seed. In infected plants, 2% of seeds may carry the virus.

Biology

Common mouse-ear flowers from April to September (Clapham *et al.*, 1987). The flowers are self- or insect-pollinated (Grime *et al*., 1988). Seed is shed from June onwards. There are around 40 seeds per dehiscent seed capsule. The seed number per plant is given as 6,500 by Salisbury (1961) and 1,000 to 1,500 by Guyot *et al.* (1962).

In laboratory studies of seed germination in the light, in the dark or in the dark following a light flash of 1 or 5 seconds there was almost complete germination in the light (Milberg, 1997). Fewer seeds germinated in darkness following a light flash and very few in complete darkness. The level of germination was positively correlated with the intensity and duration of the light flash. The addition of nitrate also increased the level of germination but there was no interaction with light. Seeds gave 95% germination at alternating temperatures under a 'safe' green light but only 12% in darkness (Grime *et al.*, 1981). There was no germination at a constant temperature in darkness. When seeds were put to germinate under a leaf canopy or in diffuse white light there was just 3% germination under the canopy and 98% in the light (Górski *et al.*, 1977).

The seeds germinated and seedlings emerged within 16 days of sowing (Long, 1938). Seed sown in pans of field soil emerged throughout the year but mainly in autumn (Brenchley & Warington, 1930). Most seeds had germinated within 2 years. Seedling emergence in field plots cultivated at monthly, 3 monthly, or yearly intervals or not at all, extended from March to November (Chancellor, 1964). Seedling numbers were low but there were slight peaks in March and August/September. Numbers were lowest on the uncultivated plots. A few of the seeds sown in a 75 mm layer of soil in cylinders in the field and stirred periodically, emerged soon after sowing in autumn (Roberts, 1986). Seedling emergence continued through the autumn and winter. Subsequent emergence was spread evenly through the year with a small peak in April. A reducing number of seedlings emerged in subsequent years and viable seeds still remained after 5 years.

The stems are procumbent or erect, the spreading stems sometimes rooting at the nodes (Frankton & Mulligan, 1970). The plant forms prostrate patches with the flowering stems becoming erect.

Persistence and Spread

Thompson *et al.* (1993) suggest that based on the seed characters, common mouse-ear seed should persist longer than 5 years. Seeds have been recorded in enormous numbers in the soil beneath pastures even though the plant may be poorly represented in the vegetation (Chippindale & Milton, 1934; Champness & Morris, 1948). Seed longevity in soil is given as 5-6 years by Guyot *et al.* (1962). Seed can remain viable in soil for over 40 years according to Salisbury (1961). Seeds recovered from excavations and dated at 92 and 600 years old are reported to have germinated (Ødum, 1978). The decline of seeds broadcast onto the soil surface and then ploughed in was followed over a 6-year period of cropping with winter or spring wheat grown on a clay and a silty loam soil (Lutman *et al.*, 2002). Every effort was made to prevent further seed return to the soil. Common mouse-ear had a mean annual decline rate of 35% and an estimated time to 95% decline of 6-9 years.

Seed has occurred as a contaminant in samples of clover and grass seed (Long, 1938). In seed samples tested in 1960-61, common mouse-ear seed was an impurity in 2 to 10% of white clover seed samples of UK, Dutch, Danish and New Zealand origin (Gooch, 1963). Seed samples of ryegrass and other cultivated grasses were similarly contaminated.

Seeds have been found in cattle and horse-droppings. Apparently-viable seeds have been found in samples of cow manure (Pleasant & Schlather, 1994). Seedlings have been raised from the excreta of various birds (Salisbury, 1961). The seeds are sometimes ingested by earthworms and seeds have been recovered in the worm casts (McRill 1974). Common mouse-ear seed was found in over 60% of worm casts collected on a neutral grassland (Thompson *et al*., 1994). The weed was not a constituent of the vegetation cover and seed probably came from previous horticultural use of the field. The seeds may be carried by flood water (MacNaeidhe & Curran, 1982).

Management

The weed is kept in check by early-sown cereals, by deep ploughing and by thorough surface cultivations especially in hot weather (Long, 1938; Morse & Palmer, 1925). In a comparison of different tillage regimes in winter cereals, common mouse-ear was favoured by reduced cultivations (Pollard & Cussans, 1981). Laboratory studies suggest that cultivating in darkness would reduce or at least delay the emergence of common mouse-ear (Milberg, 1997).

In grassland, harrowing and close grazing with sheep are effective control measures. Common mouse-ear was able to emerge and grow rapidly to dominate areas of grassland that had suffered disturbance (Burke & Grime, 1996). It is not grazed by rabbits (Tansley, 1949).

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